

### **REMARKS**

In the Subject Application, claims 1-65 are pending, and of the pending claims, claims 21-27 and 31-44 are withdrawn from consideration. In the Office Action, the Examiner has rejected claims 1, 5-20, 28-30, 45, and 49-65 and objected to claims 2-4 and 46-48. Applicants have cancelled claim 49 in this amendment.

### **Specification**

Applicants have amended the Abstract of the Disclosure to limit the text of the Abstract to one paragraph and have corrected the typographical error of the word "one" on the eleventh line of the Abstract.

### **Claim Objections**

Applicants have corrected the claim objections indicated by the Examiner, for example, all occurrences of the term "2,3 dimethylbutadiene" were corrected to read "2,3-dimethylbutadiene"; all occurrences of "irridium" were corrected to read "iridium"; all occurrences of "paladium" were corrected to read "palladium"; the occurrence of "corrdinate" in claim 63 was corrected to read "coordinate".

### **Claim Rejections - 35 U.S.C. § 112, first paragraph**

Claims 28-30 were rejected under 35 U.S.C. § 112, first paragraph, because in the Examiner's opinion the specification is enabling for *irradiating to photoexcite the photocatalyst*, but not for *irradiating to thermally heat the photocatalyst*. Therefore, the Examiner concluded that the specification does not enable any person skilled in the art to which it pertains to use the invention commensurate in scope with these claims. Though Applicants disagree with the Examiner's rejection because

the ordinary meaning of the term "irradiating" and the specification are consistent, Applicants have herein amended claim 28 to clarify the scope of the claim.

**Claim Rejections - 35 U.S.C. § 112, second paragraph**

Claims 7, 8-16, and 49-65 were rejected under 35 U.S.C. § 112, second paragraph as being indefinite for failing to point out and distinctly claim the subject matter which applicant regards as the invention. Applicants have corrected the antecedent basis concerns of the Examiner in claims 7, 8, 14, 16, 49, 51, 52, 58, 60, 61, 62, 63, and 65.

**Claim Rejections - 35 U.S.C. § 103(a)**

Claims 1 and 5-15 are rejected under 35 U.S.C. § 103(a) as being unpatentable over the publication MacQueen et al., "Competitive Hydrogen Production and Emission Through Photochemistry of Mixed-Metal Bimetallic Complexes", Inorganic Chemistry (no month, 1990), vol. 29, No. 12, pp. 2313-2320 ("MacQueen"). Applicants respectfully traverse this rejection.

Applicants respectfully submit that a *prima facie* case of obviousness has not been established with respect to claims 1 and 5-15. Applicants respectfully submit that to establish a *prima facie* case of obviousness under 35 U.S.C. § 103(a) requires, among other things, that the cited references, whether taken alone or in combination, must at least teach or suggest each and every element of the claim. Applicants respectfully submit, however, that the cited references, whether taken alone or in combination, fail to teach or suggest each and every element recited in claims 1, and 5-15 and therefore respectfully request that the obviousness rejections with respect to these claims be withdrawn.

Of the rejected claims, claim 1 is an independent claim and claims 5-15 are dependent therefrom, either directly or ultimately. First, Applicants submit that

these claim 1 is allowable at least because the MacQueen fails to teach or suggest a protic solution. The Examiner contends that acetone is a protic solution. This is not correct according to the art accepted definition. A protic solution as understood by one skilled in the art is a solution capable of acting as a proton donor. Acetone,  $(\text{CH}_3)_2\text{C}=\text{O}$ , is well known to be an aprotic solvent since the compound is not capable of acting as a proton donor within the understanding of one skilled in the art. In addition, as the Examiner states, MacQueen does not teach a coproduct trap. It is not understood why the Examiner states that it would have been obvious to one having ordinary skill in the art at the time of the invention was made to have modified the process of MacQueen by adding a coproduct trap. The process of MacQueen does not suggest or motivate one skilled in the art to add a coproduct trap. As understood, the process described in MacQueen does not even generate a coproduct. As such there would be no motivation to add a coproduct trap or to conduct the reaction in a protic solution. Applicants respectfully request reconsideration of the rejection based upon obviousness.

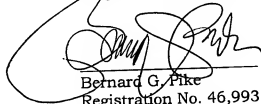
Claims 17-20, 45, 49-59, and 61-65 were also rejected under 35 U.S.C. § 103(a) as being unpatentable over MacQueen. The Examiner has applied MacQueen in the same manner as above and incorporated that description of MacQueen into the rejection of claims 17-20, 45, 49-59, and 61-65, of these claims, Claims 17 and 45 are the only independent claims. Independent claims 17 and 45 describe a process comprising a reaction medium comprising, at least in part, a protic solution and a coproduct trap. Therefore, for at least the same reasons as described above in the discussion of the rejection of claim 1, Applicants respectfully traverse the rejection of Claims 17-20, 45, 49-59, and 61-65. Accordingly, Applicants respectfully request withdrawal of the obviousness rejection with respect to these dependent claims. See

MPEP §2143.03 (stating that if an independent claim is non-obvious under §103(a),  
then any claim depending therefrom is non-obvious).

**CONCLUSION**

Applicants believe that they have fully addressed each basis for rejection. Reconsideration of the claims of the subject application and issuance of a Notice of Allowability is respectfully requested. Should the Examiner have any remaining concerns, he is requested to contact the undersigned at the telephone number below so that those concerns may be addressed without the necessity of issuing an additional Office Action.

Respectfully submitted,

A handwritten signature in black ink, appearing to read "Bernard G. Pike", is written over a horizontal line.

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